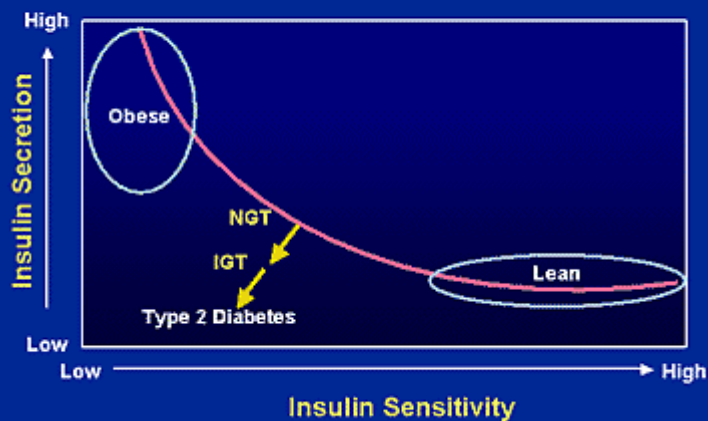


Hyperbolic Relationship Between Insulin Secretion and Insulin Sensitivity



Adapted from Kahn SE et al. *Diabetes*. 1993;42:1663-1672.

How to Increase Insulin Sensitivity, and Why

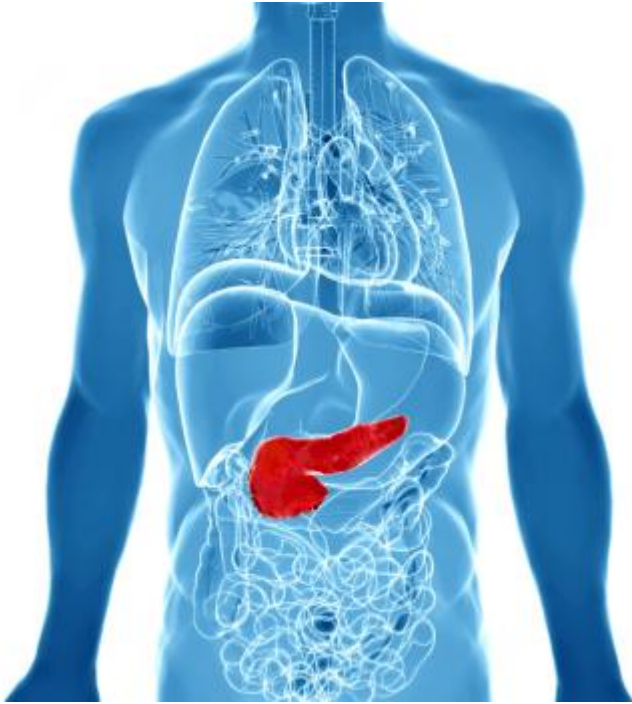
Insulin sensitivity means how sensitive the cells of the body are to the effects of insulin, the hormone that promotes the uptake of nutrients, especially glucose, into cells. [Good insulin sensitivity is crucial for good health as well as healthy aging.](#) Here we'll discuss how to increase insulin sensitivity, and why.

Why should you increase insulin sensitivity?

Let's start with the "why" first, since learning why insulin sensitivity is important will motivate you to get and maintain it.

When you eat any kind of food (other than pure fat), the beta cells of the pancreas secrete insulin so that nutrients enter cells to be used for energy, growth, and repair.

If your body requires only a minimal amount of insulin to do this job, you are highly insulin sensitive.



The opposite of insulin sensitivity is insulin resistance, which is any condition in which the body requires more than the minimum for nutrients to enter cells. Insulin resistance is strongly associated with obesity, although many normal weight people are also insulin resistant. To compensate for insulin resistance, the pancreas produces more insulin, leading to hyperinsulinemia.

You should care about insulin sensitivity because it is associated with many diseases, most notably type 2 diabetes, but also heart disease and cancer.

When insulin resistance gets very high, and the body can no longer produce enough insulin to compensate, blood glucose rises and type 2 diabetes exists.

[Insulin resistance, not cholesterol, is one of the main causes of heart disease.](#) High blood insulin, or hyperinsulinemia, very likely plays [a major role in the development of cancer.](#)

In lab animals, even small (~25%) decreases in circulating insulin levels [result in a substantial increase in lifespan.](#)

Why does insulin sensitivity decrease?

When you eat carbohydrates, they are broken down to glucose for use as fuel.

If you ingest more carbohydrates than can be readily burned, the resulting glucose is made into glycogen, the storage form of glucose, and stored in the liver and skeletal muscles. The glycogen in the liver is used to maintain a constant supply of blood glucose, and muscles keep glycogen on tap for use at high intensities of exertion.

If you don't regularly use up your stored glycogen, and/or you ingest too much high-carbohydrate food, the liver and muscles become essentially saturated with glucose, and the cells with glucose.

Insulin resistance results. Insulin resistance is the cells' way of saying "No more glucose, please."

In insulin resistance, insulin levels in the blood rise to compensate for decreased efficiency. Ultimately, diabetes can result.

How to increase insulin sensitivity

There are two main ways to increase insulin sensitivity:

1. diet
2. exercise.

Diet: In the case of diet, the answer to increased insulin sensitivity is simple: cut the carbohydrates.

A low-carbohydrate diet, at 21 grams a day (which is very low and induces ketosis), and *not restricted in calories*, caused [a 75% increase in insulin sensitivity in only 14 days in obese patients with type 2 diabetes](#). It also resulted in 1.65 kg (3.6 pounds) of weight loss in the same time period. Note that calorie intake spontaneously decreased by over 1000 calories a day, so the improved insulin sensitivity may be due to either lower carbohydrate itself, or improved satiety through less carbohydrate and more fat and protein causing lower calorie intake. Either way, it works.

[A so-called low carbohydrate diet consisting of 35% of calories as carbohydrate failed to improve insulin sensitivity](#). That's not really a low-carbohydrate diet, so no wonder they didn't get good results.

The reason for low-carbohydrate diets increasing insulin sensitivity is simple: you quit flooding your system with glucose. Eventually, the glycogen tank declines, and insulin sensitivity increases. You're no longer trying to stuff glucose into an overfilled tank.

To increase insulin sensitivity through your diet, eat little or no refined carbohydrates (basically anything made with flour such as bread and pasta), no sugar, and [no vegetable oils](#). Omega-6 fatty acids from vegetable oils [initiate or aggravate insulin resistance](#), while omega-3 fatty acids from fish and fish oil [prevent insulin resistance](#).

[Fasting and/or a very low calorie \(crash\) diet may not only increase insulin sensitivity but cure diabetes](#).

Exercise: Exercise, both [aerobic exercise](#) and [resistance training](#) (weightlifting) increase insulin sensitivity.

In exercise, the body burns both fat and carbohydrate (glycogen). At low intensity, say walking, fat-burning predominates. At high intensity, the body uses a higher proportion of glycogen.

Therefore, high-intensity exercise ought to burn more glycogen and improve insulin sensitivity the best. Does it?

Indeed, a mere two weeks of high-intensity interval training (stationary cycling), for a total of 6 sessions, [increased insulin sensitivity by 35%](#). GLUT4 receptors, which take up glucose into muscles, increased in number comparably to high volume endurance training.

[Another study](#) showed that only two weeks of high-intensity interval training, for a grand total of 15 minutes of exercise over the two weeks (sic), improved insulin sensitivity. The subjects were young, healthy men, not diabetics.

Increasing your insulin sensitivity through exercise is a matter of both intensity, and volume. If you exercise at lower intensity, you need more volume, since you won't be burning as much glycogen. At [high intensity](#), much less volume is required to increase insulin sensitivity.

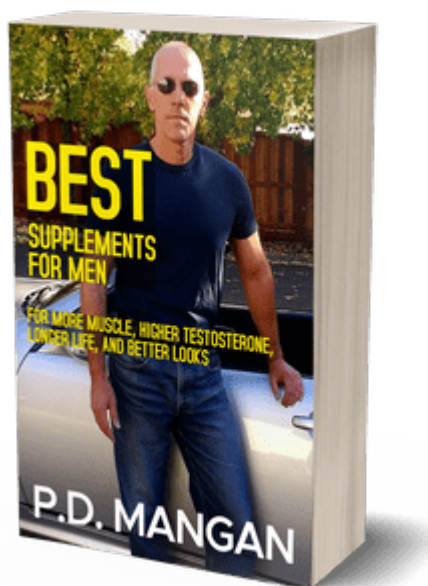
The same applies to lifting weights: insulin sensitivity improves more when you [lift at high intensity](#).

Conclusion

Good insulin sensitivity is critical for health, arguably one of the most critical factors for staying healthy.

Insulin sensitivity is mainly a result of lifestyle factors, notably a diet low in refined carbohydrates, sugar, and industrial seed oils, as well as exercise. High-intensity exercise is particularly good for increasing insulin sensitivity, since it helps burn glycogen and deplete glycogen storage.

PS: My new book is [Best Supplements for Men](#).



PPS: [Check out my Supplements Buying Guide for Men](#).